

OBSERVATIONS ON THE CHINESE MANTID *PARATENODERA SINENSIS* SAUSSURE

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During the latter part of August and September of the past few years, the New York newspapers have had something out of the ordinary to feature in accounts of a "new bug" which had descended in numbers upon the city.

Last season (1931), the invasion had extended into southwestern Connecticut, and there are reasons for believing that the insect is actually now completing its life cycle within the confines of the State.

This refers to the Chinese mantid, *Paratenodera sinensis* Saussure, which is, of course, not a native species. The European mantis, *Mantis religiosa* Linn., introduced from the Old World and now well established in New York State about Rochester and Ithaca, where it was first reported in *Entomological News*, December 1899, by the late Professor M. V. Slingerland, and has recently appeared on Long Island, where it was discovered by Mr. Burns of the American Museum, has not as yet been taken in Connecticut, although egg masses were brought here in 1903, as stated in Mr. Walden's *Orthoptera of Connecticut*. These failed to hatch.

There are at least four other adventive species from the South which have been rarely taken in the North, where they were probably brought in on produce or on freight cars. The most frequent of these has been the common mantid of the South, *Stagnomantis carolina* Linn.

The Chinese mantid, however, is the species which has actually gained a foothold in the New York region and may become naturalized in parts of Connecticut.

Several attempts have been made to artificially establish it in the latter state. The first was in the winter of 1903, when Dr. Britton arranged for the importation of a number of egg masses from Philadelphia. A few of these hatched the following spring, but it is not thought that any reached maturity. The following winter a further attempt was made when about 25 more egg masses were obtained and distributed in five different localities.

"About a dozen adult specimens in all were seen in three of these localities the following fall, and in one of these localities a few adults were found the second season." However, the mantid was not observed in numbers again until this season.

The first establishment of the Chinese mantid in this country was near Philadelphia. Egg masses were accidentally brought in with nursery stock from Japan, and the first mantids were noted at Meehan's Nursery, Germantown, Pennsylvania, in about 1896. On February 1, 1902, an egg mass was sent in to the New Haven Experiment Station from a nursery in New Haven where it was found upon *Ilex crenata* which had been imported direct from Japan the previous spring. Another egg mass was found in the same nursery during the summer of 1903. In 1902 it was introduced into Staten Island by Mr. William T. Davis.

The Philadelphia colony was successful from the start as was also the Staten Island introduction. From Philadelphia the mantid extended its range more rapidly to the Northeast than in any other direction, although egg masses were planted in many parts of Pennsylvania. The species soon became common in New Jersey, where it may be now even classed as abundant in certain sections. It seems to prefer the drier areas, occurring most frequently on dry, bushy hillsides.

As it reached New York and Long Island, the mantid began to attract considerable attention. In 1928, inquiries were frequent at the American Museum of Natural History, most of the specimens coming from New Jersey, some from Long Island and some from New York City, where the specimens were taken on buildings.

In 1929, almost a hundred inquiries were received by the American Museum, and this figure was exceeded in 1930 and 1931, according to information received from Mr. Mutchler, who writes me under date of October 28th, "that during 1931 there were approximately 100 of such requests in New York City, Long Island and Westchester County, one coming from Mamaroneck." The greatest number in one day was on August 31, when seven letters and phone calls were received relative to this species. In 1930, specimens were found in an office located on the 40th floor of a building in the vicinity of 42nd Street and one or two specimens on the roof of the Equitable Building. During 1931 several were seen or taken on top of the Empire State Building.

On Staten Island, six specimens in one day have been received at the Museum, according to Mr. Leng. In 1929, an egg mass was found at Queens, L. I. by Mr. Engelhardt.

Its appearance on buildings in the large cities is amazing, but is probably due to the fact that as soon as the mantids mature and gain wings, there is a period of a couple of weeks or so when both sexes fly very readily and are no doubt carried by the wind considerable distances. The males fly during most of the period of their adult existence, but the females do not fly after they become heavy with eggs.

Being such a large and grotesque insect, it attracts attention wherever found. It was used by Herbert Johnson in a cartoon in the *Saturday Evening Post* of September 13, 1930, to represent the "Stock Market Bug."

It seems probable that it will become established in Westchester County and southwestern Connecticut. Its ultimate spread can only be conjectured. It is an insect which seems to be best favored by urban conditions. Probably its worst enemies are squirrels which, according to Mr. Davis, eat into the egg masses. Certain birds, as woodpeckers, or blue jays, do likewise. When its range overlaps that of the Carolina mantid, its eggs may become parasitized by the small chalcid which attacks those of the Carolina species. The much thicker protective coating of the egg masses of the Chinese species may, however, prevent this. At Stamford, a small jumping spider was noted feeding on the immature mantids.

The history of the Chinese mantid in Stamford, Conn., goes back to 1929 when two immature individuals were received at the Bartlett Tree Research Laboratories from Mr. William T. Davis of Staten Island. The first was received early in August, and was placed in a window between the glass and the screen. It fed readily on the following:

- Black ants, *Formica subserica*
- Deer flies, *Chrysops* sp.
- Squash bug nymphs, *Anasa tristis*
- Spotted cucumber beetles
- Cabbage butterflies
- Small fritillary butterfly
- Bean moths, *Hypona scabra*

About the middle of August, another immature specimen was received which was larger than the preceding.

Between August 13 and August 20, this individual ate:

- 1 Bumble-bee worker, *Bombus vagans*
- 2 Cabbage butterflies
- 1 Viceroy
- 1 Carolina locust
- 1 Scudderia katydid

It rejected a *Vespa vidua* worker.

On August 22, it devoured a blow fly, *Calliphora erythrocephala*, and a black field cricket.

Both individuals died before attaining maturity.

On March 18, 1930, eleven egg masses were received from Mr. Davis. These were placed in glass fruit jars and kept in the Insectary until hatching as a protection from squirrels.

The eggs hatched over a period of ten days, beginning June 9th. As a rule, only one egg mass hatched the same day, but two hatched simultaneously on June 19th. One egg mass failed to hatch. Approximately 75 mantids hatched from each egg mass. These were liberated in many different places in the vicinity of the Laboratories. A few of the mantids were noted about the points of liberation for several days following; then they were seldom seen. On June 19th, a small jumping spider of the genus *Phiddipus* was seen feeding on one of the mantids of a fresh liberation, several hours after, and a careful examination revealed the fragments of two or three others which had evidently shared a similar fate.

During August, none were seen. On September 17th, a large mantid in the last instar was noted by Mr. Bartlett on a small chestnut tree within 20 feet of one of the points of liberation. On September 20th, this mantid which had not moved from the tree on which it was found, matured, developing wings, and was not seen the next day. The only other full-grown specimen was one which was seen by Robert Bartlett on the porch. This flew away. No others were seen or were egg masses found during the fall or winter.

During 1931, however, two adult females were noted in the vicinity of the Laboratories. One was discovered on September 22, within 50 feet of one of the points of the 1930 liberation and another on September 23 within 10 feet of a point of liberation. The latter was motionless on a small pin oak about 5 feet high, facing head downward on the main stem. It was not disturbed and on September 24th an egg mass was noted in the exact spot

occupied by the mantid on the preceding day. A search disclosed the mantid about six feet from the tree, on the ground, where it was stalking a grasshopper (*M. femur-rubrum*) on a weed stem about 15 inches from the mantid's position. It moved slowly toward the grasshopper until within about three inches when it gave a sudden spring, capturing its prey on which it immediately began to feed. In seizing the grasshopper, it grasped also the weed stalk, securely bracing its prey against the stalk.

Both specimens were kept for a few days, the first being liberated before egg laying, and the second was kept for a week or more when it became weakened and was killed and kept for a specimen. They were fed mostly on grasshoppers which they seemed to prefer to other food. They ate many blue-bottle flies. Mexican bean beetle adults were eaten at first, but they soon tired of these and after a while would not touch them when other food was available.

An unverified report of one of these mantids attacking a field mouse in New Jersey prompted the experiment to determine if vertebrate prey would be taken. A small wood frog was introduced into the enclosure where one of the mantids was being kept. The mantid seized the frog but immediately rejected it without attempting to bite it, nor could it be induced to take the frog again. A large, active worker European hornet, *Vespa crabro*, was given to one of the mantids. A strenuous struggle was expected, but this was not realized, the mantid seizing the hornet with no more ado than it would a grasshopper and devoured it. The large hornet was completely helpless in the grasp of the powerful mantid. It was seized by the head and abdomen. The thorax was chewed into and hollowed out first.

Other mantids, however, were taken last year at Stamford, six miles away from the Laboratories, and also at Greenwich and South Norwalk. It is not thought that these were the progeny of the 1930 liberations at North Stamford, but rather individuals which had flown up from New York State, although it is possible that there have already been colonies established near the coast by preceding invasions.

A mantid was taken several years ago near Old Greenwich (formerly Sound Beach) and is now in the Bruce Museum at Greenwich. At least two were found in 1931 in early September on buildings or in the streets of Stamford, and others were found in Greenwich. On September 18th, a male was found by the

writer in a field near Stamford. It was in flight when first noted and resembled the large bird-winged grasshopper (*Schistocerca americana*). As this would have been a remarkable record, I followed the specimen until it came to rest, when its identity was betrayed.

The economic status of this insect is probably not and will not be of importance. It is supposedly beneficial and probably prefers, in nature, other orthoptera, such as grasshoppers, but its sedentary habits precludes its feeding on a very great number of insects during its lifetime. I have come to believe that caged specimens fare much better as regards food than those in the field. It would not feed to any extent on beetles and experiments have indicated that it is not extremely fond of caterpillars. Mr. Davis states that those in his back yard were seen feeding on honey bees more frequently than other prey. If sufficiently starved, they will probably attack almost any insect that they could overpower, but their average food would no doubt consist of those insects which would be the most available, the most easily captured and overcome and which would appeal most to the mantid. Until further observations are made on the prey of the mantid under field conditions, this range of food could only be imperfectly surmised.

Another introduction of this species was made in Connecticut by Dr. Frank Lutz of the American Museum, and Professor F. M. Brown at Avon Old Farms, Avon, near Hartford, where egg masses were placed in the spring of 1929 and where later an adult mantid was noted by Mr. Brown.

During 1931, also, several adult specimens were collected in Columbus, Ohio, where the egg masses were probably accidentally brought in on nursery stock.

EDITORIAL NOTE—Some hundred or more egg-masses were found at Hastings-on-Hudson by Mr. Wm. Vogt. Fifty or so were put in the shrubbery at my house in White Plains, N. Y., where one large female was found about September 15. Another specimen was taken in White Plains in August.